COST *and* MANAGEMENT

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PLANT COST CONTROL THROUGH DEPARTMENTAL BUDGETS
by W. J. Tagtmeier 84

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MANUFACTURING STATISTICS AND THEIR MORE COMMON USES
by A. Cohen 90

Mr. Cohen joined the Government Service in the Department of Trade and Commerce when only 18 years of age. He was granted leave-of-absence during which time he attended Queen's University, graduating with a B.Com. degree. He then went back to the Civil Service, joining the Dominion Bureau of Statistics where he was appointed Chief of Manufacturing Statistics, in 1931. He is the author of "The Quantity of Manufacturing Production in Canada, 1923-1929." He also contributed a monograph on "The Manufacturing Industries of Canada" to the World Book (British Empire Edition) and has published other articles in various publications on Manufacturing Statistics.

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SOCIETY NOTES

NEW DEPRECIATION REGULATIONS

Reports from many of our Chapters show that the new Depreciation Regulations, issued towards the end of last year, have aroused a very lively interest in the ranks of the industrial and cost accountants. It can be stated that accountants attribute more importance to these regulations than to all the other sections of the new Income Tax Act together.

The application of the new regulations, which are retroactive to the year 1949, causes much concern to the practical accountant. No satisfactory solution has yet been presented, for instance, for the problem, how to deal, in future, in the books with assets disposed of, but not fully written off at the time of their disposal. There are a number of similar problems which the accountant must face and for which there are no ready-made solutions available.

Altogether, the impression is widespread that the Department of National Revenue should have consulted the representative bodies of Professional Accountants before the new regulations were issued, or the new sections submitted to Parliament.

The subject of Depreciation has been considered in detail during the Tax Conference convened by the Canadian Tax Foundation at Ottawa, in November, 1948. At that time it was agreed that depreciation allowed in computing taxable income should not be confined to the amount provided in the books of the taxpayer. It had been demanded, at that time, that business management should be free to select whatever method of depreciation accounting deemed appropriate, without penalty from the Income Tax standpoint. Nevertheless, the new regulations retained expressly the rule heretofore established only in the Department's practice, that the depreciation claimed must not exceed the amount provided for this purpose in the books of the taxpayer.

The article, The new Income Tax Regulations on Allowances of Capital Cost (Depreciation) by George Moller, in the January 1950 issue of Cost and Management, was followed by

numerous articles in other accounting publications and the February number of the "Canadian Chartered Accountant" publishes an open letter to the Minister of Finance by the Committe on Accounting and Auditing Research protesting the limitation of the capital cost allowance to the amount shown on a company's financial statement. Apart from this open letter, the magazine comments in the editorial section on the depreciation regulations and prints a leading article, under the heading, "A Long Step Backwards: Diminishing Balance Depreciation," by Professor Byrd, of McGill University.

All interested forces should co-operate in demanding a change of sub-section 4 of Section II00, which, according to the reports received here, is unanimously objected to in all the discussions which have taken place since the issue of the regulations. The elimination of this sub-section would alleviate the situation to a great extent.

An exchange of opinions and suggestions for practical procedures in application of the new regulations should be encouraged and it may be assumed that most of the Chapters will continue to discuss and comment on the problems involved, in the near future. We invite reports on these discussions.

It remains to be seen whether the leading organizations of Public Accountants and Industrial and Cost Accountants will unite in their efforts to promote a uniform understanding in the application of the new depreciation rules and their presentation in financial statements.

It would be interesting to see what result such a united effort could bring in the field of practical accountancy, especially concerning a subject by which almost every business enterprise is in some way or another affected materially.

The Department of National Revenue should be asked to issue, in the near future, a booklet similar to the Explanatory Brochure on The Dominion Succession Duty Act, explaining to the public the rather involved new regulations, especially where these regulations are a definite and basic departure from the practice used heretofore, and subject to misinterpretation.

The general confusion has recently been increased by the Departmental Directive which the Director of the Corporation Tax Service of the Province of Ontario has seen fit to issue under the date of 3rd February, 1950, decreeing that for the fiscal year 1949, and any fiscal year ending therein, depreciation will

be allowed for Quebec Corporation Tax purposes, on the method used in 1948 and 1947 or, in other words, the Diminishing Balance method will not be acknowledged by Quebec. No indication is given whether this deplorable excursion into stressed autonomy will be limited to 1949.

There is almost general agreement that a simpler and more direct way could have been chosen by the Dominion to bring the taxpayer the relief which the new regulations apparently intended to confer upon him, perhaps we may console ourselves with the old hymn text:

" . . . our pleasures and our discontents,
are ways by which we may ascend."

COST AND MANAGEMENT CONFERENCE NEWS

We couldn't miss this opportunity of letting all our readers in on the latest information regarding the 29th Annual Cost and Management Conference, being held at the King Edward Hotel, in Toronto, Ontario, June 22, 23 and 24.

The Conference Committee, very much aware of the difficult job they face in surpassing last year's conference, at Banff, have really put their shoulders to the wheel, and produced a program of a very high order.

In the technical sessions, four different themes will be discussed, namely:—"Simplifying Your Records", "Charting a Course Through a Recession", "Psychology in Business Relations", and "Making Statistics Talk". Each of these topics will be handled by one or more highly capable speakers, with at least one Panel Discussion. There should certainly be something of interest for every S.I.C.A. member in this particular part of the Conference.

Reception Chairman Charlie Warnes tells us that big things are in store for the ladies on Thursday and Friday afternoons. While the men are bettering themselves mentally, the ladies won't be left to twiddle their thumbs. So don't leave the better half at home; bring her out to meet a swell bunch of people from all over Canada. You had better ask her right away if she'd like to come, because if you don't, and she reads our official program and finds out about the big dance on Friday, the 23rd, with a name band, etc., etc., your life is going to be pretty miserable for a while.

And then, we must not forget the big Office Equipment Show being held in conjunction with our Conference. Chairman Les Hope has his committee working at top speed, selling and allotting space to a large group of exhibitors and with over 4000 feet of floor space available, it looks like a good show all 'round.

All the above attractions, together with the Annual Meetings of both the Canadian and Ontario Societies and their attendant luncheons, fellowship hours, good shopping facilities and topped off with a potential trip to Niagara Falls for visitors from afar, should add up to something in the "Can't Miss" class. Here is a chance for every member of S.I.C.A. to increase his knowledge, increase his circle of friends and increase his interest in his Society. We sure hope we'll meet you in Toronto in '50.

New Members

CALGARY CHAPTER

John G. Beare, Imperial Oil Limited.

EDMONTON CHAPTER

Gerard Delane, Northwestern Utilities Ltd.
Kenneth C. Stewart, Northwestern Utilities Ltd.
Charles A. Robson, Muttart Lumber Co.

KITCHENER CHAPTER

M. Kawasoe, Dominion Electrohome Industries Ltd.
G. J. Swartzentruber, P.O. Box 485, New Hamburg.

NIAGARA CHAPTER

L. A. Bruce, Canadian Carborundum Co. Ltd.

REGINA-MOOSE JAW CHAPTER

E. W. Bodnar, Burroughs Adding Machine of Canada Ltd., Regina.
N. Duchak, Grant Hall Hotel, Moose Jaw, Sask.

TORONTO CHAPTER

James D. Wilson, Business Systems Limited.

VANCOUVER CHAPTER

Sydney M. Rosenburg, Canadian Fishing Co. Ltd.

WINDSOR CHAPTER

G. L. Gratton, Auto Specialties Ltd.

PERSONALS

Congratulations to Mr. Paul Simard, director of the Quebec Chapter, on his appointment as Director of Personnel for the City of Quebec.

Chapter Notes

BAY OF QUINTE

At the January meeting, the members and an exceptionally large number of guests were formally welcomed by Chairman Les Lennox, with the greeting that the Chapter is always glad to show visitors that it is a "live and going concern."

The speaker of the evening, Mr. G. I. MacKenzie, Industrial Advisor of the Bank of Montreal, Toronto, was introduced by Wilf Richardson. Mr. MacKenzie, a Director of the Toronto Chapter, and Honorary Treasurer of the Dominion Society, opened his talk with a brief outline of the growth of the Society during his twenty years as a member.

Mr. MacKenzie spoke on the subject, "Technical Eyes in Banking", and at the close of his talk, Frank Lead thanked the speaker, on behalf of the Chapter.

FORT WILLIAM - PORT ARTHUR

About 35 members of the Fort William Chapter of the Society of Industrial and Cost Accountants of Ontario gathered for their monthly dinner meeting at the Hi-Land Inn, Port Arthur, on Monday, February 20, 1950.

Members and their guests were welcomed by the Chairman, C. D. Henderson, and following dinner a "baseball" game", using accounting questions was conducted.

With Mr. L. Dack, as umpire, the "Bookmarks", led by Captain Art Hunter, defeated the "Bookworms", under Captain Bill Storozuk, by a score of 25 to 24.

HAMILTON CHAPTER

The Hamilton Chapter of the Society of Industrial and Cost Accountants heard an address by Mr. J. H. Goodwin, Controller of Columbus McKinnon Chain Co., Tonawanda, N.Y., on practical uses for Tabulating Equipment, at its monthly meeting, held at the Royal Connaught Hotel, on Thursday evening, February 16, 1950.

The speaker pointed out that the basic reasons for using mechanical equipment were mainly twofold: first, for records, and, secondly, for control purposes.

Mr. Goodwin warned of the tendency to attempt to obtain too much unnecessary data when equipment is first installed and advised the audience to determine ahead of time the essential information required in order to obtain satisfactory operation, both economically and efficiently. Sample forms were used by the speaker to illustrate the type of records and information obtained by his company from the use of tabulating equipment.

Mr. Goodwin was introduced by Mr. L. G. Simenton and thanked for his address by Mr. C. R. Thomas.

KITCHENER

The February meeting held at the Dominion Twines Ltd., was one of exceptional interest. There were 60 members and guests on hand to enjoy the buffet supper provided by the company, and to hear Mr. Frederick Mann, Secretary-Treasurer of John Forsyth Ltd., address the Chapter on "Credits". Another highlight was the official visit of the Dominion President, Charles P. Dumas, of Montreal, who was introduced by J. N. Allan, Secretary-Manager of the Society.

NIAGARA

"The Figure Man in Business", who he is; what he does; and why he does it, was the topic of an address to the Chapter at their February meeting. The speaker, Mr. R. B. Taylor, C.A., of the Steel Co. of Canada, was introduced by Robert Waugh, of McKinnon Industries Ltd., and thanked by Gordon Elliott, of Foster-Wheeler Co. Ltd.

QUEBEC CHAPTER

The Quebec Chapter of the Society of Industrial and Cost Accountants held its January meeting on Wednesday, January 25th, at Le Cercle Universitaire. Mr. Jacques E. Fortier, C.A., R.I.A., 1st Vice-President of the Chapter, explained the new depreciation system.

ST. MAURICE VALLEY

The members and students of the Chapter gathered at the Frontenac Hotel, Grand'Mère, for a smoker. Despite inclement weather, 35 were present. The Chairman of the Chapter, D. B. Peddie, gave a short talk on study to the students.

The entertainment was well received, and everybody enjoyed the evening in lighter vein. Sandy McNab made all arrangements, and John Hanna looked after the entertainment.

TORONTO CHAPTER

The February meeting of the Toronto Chapter was arranged and conducted entirely by our student section and proved to be another highlight of the season's activities.

Professor E. A. Allcut, head of the department of Mechanical Engineering at the University of Toronto, was the speaker for the evening. His subject was "Modern Trends in Industrial Organization and Management". Professor Allcut outlined definite steps which have been made in the forward march of industrial organization and also how management is in many ways a science and an art. The interest in the address was quite intense and Professor Allcut's dry humor drew many laughs from those in attendance.

WINDSOR

There was an exceptionally fine attendance at the February meeting to hear Mr. W. D. Lawrence, Director of Excise Audit, speak on "The Application of Sales Tax". The Chapter was also honoured by the presence of the Dominion President, Charles P. Dumas, who gave a brief report on the Dominion Society. The meeting was in charge of Vice-Chairman George Morgan.

Current Literature Digest

By W. W. HENDERSON, R.I.A.

REDUCING COSTS THROUGH BUDGETARY CONTROL OF FINANCE, by A. A. Fitzgerald, The Australasian Institute of Cost Accountants, No. 30, December 1, 1949.

Anything said here in an effort to expose the essence of this article, may seem like an over-simplification of it. Such is not intended, because it is anything but simple—it has depth, as well as breadth of information.

However, the nub of it might be considered to be in the compilation of future balance sheets on a budget basis, in order to analyze a company's present and likely financial position. These budgeted balance sheets are not necessarily spaced a year apart in future, dating but instead, represent financial pictures dated at possibly shorter intervals so that seasonal variations in financial condition may be made apparent.

Since the provision of funds is an axiomatic necessity of financial management, it seems timely to conclude on the author's classification of sources of funds:—

1. Liabilities to Creditors
   - (a) Short term—no cost
     - Trade creditors
   - (b) Short-term Interest-bearing
     - Temporary bank over-drafts
     - Deposits at call
     - Bills payable
     - Liabilities on instalment purchase contracts
   - (c) Long-term, Interest-bearing
     - Bank overdrafts fixed for comparatively long terms
     - Mortgages on fixed terms
     - Mortgages or Floating-charge debentures
     - Deposits for fixed periods
2. Capital Contributions
   - (a) Temporary "no-cost"
     - Accumulated profits
     - Revenue Reserves
   - (b) "No-Cost" Capital held for fixed terms
     - Redeemable preference Shares
   - (c) "No-Cost" capital available permanently
     - Irredeemable preference shares
     - Ordinary shares

A SIMPLIFIED FINANCIAL BUDGET FOR SMALLER MANUFACTURERS, by Fred Rubman, C.P.A., The New York Certified Public Accountant, January 1950.

The subject matter in this article is very similar to that in "Reducing Costs Through Budgetary Control of Finance" (described elsewhere herein) but it is more specific in its application—namely to smaller businesses. In

consequence, while projecting the use of funds into the future, the sources of those funds are implied to be Banks and other short-term lending institutions—rather than the more complicated bond or share issues.

The mechanics of a cash budget's synthesis are very fully explained, including the adjustments arising from non-cash charges or credits to the Profit and Loss Account.

THE FUNDAMENTAL LOGIC OF PRIMARY VARIANCE ANALYSIS, by Lawrence L. Vance, N.A.C.A. Bulletin, Section 1, January 1950.

Herein lies a very interesting expansion of the theory of variances. Most of us think of quantity (or time) and price (or rate) variances only with respect to direct labour and material. The conventional computation of variance break-down is illustrated by the author in the following way:—

		Units	Unit Cost	Total Cost
1. (a)	Actual	2,500	2.00	5,000.00
	Standard	2,300	1.90	4,370.00
		200	.10	630.00
(b)	Price Variance	2,500× .10=250.00		
	Quantity Variance	200×1.90=380.00		

However, Mr. Vance suggests the following to be logically more correct:—

Price Variance	2,300× .10=230.00
Quantity Variance	200×1.90=380.00
Joint Product Variance	200× .10= 20.00
	630.00

The joint product variance, he says, is really occasioned by the fact that too much (in this example—it could be too little in others) has been used and that the price of such excess is higher than standard price. Therefore, the joint product variance is really excess quantity and excess price.

The author explains that where one year variance is considered justified and it is apportioned to "Cost of Goods Sold" and "Inventories" according to fact, then it is logical to include the joint product variance with the remaining major variance to make up a combined charge or credit to Profit and Loss Account.

Where both quantity and price variances are charges (or credits) to Profit and Loss account, Mr. Vance suggests as possibly legitimate a pro-ratio of the joint product variance to the major two in the ratio that their individual amounts bear to the combined sum of the individual amounts.

This is an interesting article, and may bring new information to many who have felt that about the last word had been said about variances.

STEP-BY-STEP ANALYSIS OF DEPARTMENTAL LABOUR VARIANCES, by Robert P. Dulude, N.A.C.A. Bulletin, Section 1, January 1950.

Where machine speed and efficiency govern production output instead of any deliberate attendant labour effort, it is apparent that variance responsibility and analysis will, in the case of a standard cost system, differ materialy from the conventional labour variance analysis.

Products made by machine are often relatively independent of the labour which tends the machines. So long as one worker can move fast enough to tend two machines and no time is lost through break-down, the output will be the same as if there had been one man assigned to each machine. Conversely, the assignment of more men to the machines will not normally effect output.

Naturally, a planned assignment of labour in terms of quantity, kind and value would be made per machine, and that assignment would constitue the direct labour budget. Departure from plan will result in variance. Such variance the author terms "labour useage".

On the other hand, in order to qualify as a standard cost system, constancy of product cost is essential and the total standard cost will depend on machine output. The difference between standard cost and the labour budget is called "Machine production variance," by Mr. Dulude.

Machine production is planned initially so that standard costs will correspond with the labour budget; but departure from plan is obviously due to machine performance rather than to direct labour effort. Idle machine time comprises a sub-division of machine production variance.

It would seem apparent that the labour useage variance could, if it be desired, be further sub-divided into "time" and "rate" variances.

The author presents this thesis on variances most comprehensively and cogently. He does not recommend that the full analysis reflected in his formulae be applied to every total labour variance—only the sizeable ones.

OTHER ARTICLES OF INTEREST

A Study in Decentralization: Controllership in a Divisional Organization,
by E. B. Rickard, N.A.C.A. Bulletin, January 1950.

Developing Significant Reports to Management from Standard Hours Data,
by T. R. Elsman, N.A.C.A. Bulletin, January 1950.

Cost Control for Effective Control of Operations in the Manufacture of Aircraft,
by F. O. Detweiler, N.A.C.A. Bulletin, January 1950.

Timely Issuance of Monthly Reports—An Outline of an Early Closing Procedure,
by Richard N. Allen, N.A.C.A. Bulletin, January 1950.

Freight,
by Robert G. Glenhall, N.A.C.A. Bulletin, January 1950.

Standard Costing and Cost Control for Manufacturers,
by A. N. C. Smith, C.A., The Accountant's Magazine, November 1949.

The Treatment of Replacement Costs,
by F. M. W. Hird, F.C.W.A., A.C.A., The Cost Accountant, January 1950.

Job Evaluation and Personnel Rating,
by W. S. Risk, B.Com., C.A., F.C.W.A., The Cost Accountant, January 1950.

How a Work-Order System Cut Costs,
by John Kallgren, Factory Management and Maintenance, January 1950.

How We Control Our Maintenance Costs
by J. R. Clemens, Factory Management and Maintenance, January 1950.

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Plant Cost Control Through Departmental Budgets

by W. J. TAGTMEIER

Effective control of factory overhead is a continuing problem in every manufacturing business. In his approach to this problem, the author advocates the use of weekly departmental budgets which are established by the use of productive indexes.

Foremen's or departmental budgets are a comparatively new tool of management and it is only in recent years that their use has become fairly widespread. The number of companies which now use departmental budgets as an aid to cost control and the growing number of reports of better cost control by these companies is good evidence that companies not using departmental budgets would do well to consider their use.

The usual statements of actual factory expenses prepared by the factory accountant shows some break-down of these expenses by type, but gives no clue to the sources which may be one or many departmental divisions of a plant. Furthermore, this statement of actual expenses usually is for the period of a month and is not available until one or two weeks after the end of the month. In short, it may be said that the usual accounting statement is almost wholly inadequate from the standpoint of cost control—yet that is all that is provided in many factories. It is the control of these indirect expenses that this paper is mainly concerned with.

FOREMAN'S OR DEPARTMENT HEAD'S ROLE

Since indirect expense cannot be directly allocated to individual parts, the best possibility for control would be to provide budgetary standards to the foremen and department heads who are fundamentally responsible for the operation of the smallest units of plant organization. It is true that the departmental supervisor is not normally responsible for the type of equipment in his department nor all of the methods used, but he is responsible for the efficient use of those provided. Moreover, he approves the supply requisitions and labor expenditures for his department and he orders maintenance work from the service departments.

COST INFORMATION REQUIRED

Certain cost information must be furnished to the budget director if a departmental budget is to be put in operation. The factory accountant must use a chart of expense accounts which is suitable for the purpose of effective budgeting. The timekeeping department has to provide a weekly departmental labor distribution by accounts of all labor for which the supervisor is directly responsible and labor from service departments for which he is indirectly responsible. The accounting department must provide a weekly summary of expense material by departments, by accounts.

Information for the budget director should be available as soon as possible after the week is over. It is well to state at this point that this paper is written from the standpoint of a weekly budget. The basic thinking in back of a daily budget is the same as for a weekly or monthly budget. There are advantages to both the daily and weekly departmental budgets and the choice must depend on the type of plant. A month is usually too long a period for effective departmental budgeting.

It is generally customary in manufacturing plants to group similar operations or processes by departments. Examples of departments found in various factories are Heat Treating, Automatic Screw Machine, Small Casting Machining, Punch Press, Assembly, etc. This is one of the chief reasons that departmental budgets are so very effective because under departmental grouping there usually exists a continuity in the relationship of expenses to productive labor regardless of the type of product being manufactured during the different periods of the year. The management of a company must analyze their departmental grouping very carefully to be sure they are getting the best possible results from the standpoint of cost control.

QUALIFICATIONS OF A BUDGET DIRECTOR

The person chosen to head up a department budget control must be thoroughly familiar with shop practice. An accounting background is not sufficient. If he is not familiar with shop methods and problems, the time he spends in digging through details and establishing budgets will to a large extent be wasted because he will not be capable of recognizing "red flags" in the figures and he will be unable to determine the reasonableness or unreasonableness of costs. Departmental expense budgeting is far from being an exact science and the person chosen to head this

phase of cost control must be able to exercise initiative and imagination if the budget is to be effective.

The budget director must realize that departmental supervisors have many problems other than costs and that each supervisor must be dealt with according to his enthusiasm for the budget and his ability to understand it. In helping the supervisor analyze his costs, the budget director can demonstrate that budgets have a definite purpose, and it will be from such discussions that possibilities for cost reduction will be found. It may seem unnecessary to mention these points, but it is being done to emphasize the necessity of making the departmental budget a living workable tool. If the budget reports are allowed to become stagnant pages of figures to be pigeon-holed in foremen's desks, then it is possible the good derived from the budget will not even equal the costs of administering it.

It might be well to mention at this point that financial forecasts and departmental budgets are two different things and it is difficult to have the same person head both functions. Budgets for control purposes usually are best handled by someone with the industrial engineering viewpoint. Financial forecasts usually are best handled by those in charge of finance and accounting. There is some overlapping between the two and the question of who does what, depends on the personnel available for the work.

RANGE OF DEPARTMENTAL BUDGET

Budgets should be established for all items of expense which appear in the chart of accounts. As previously mentioned, the chart of accounts should give a break-down of expense in sufficient detail to be of maximum usefulness for departmental budgeting. In the farm equipment plants with which the writer is familar, there are three main expense statements, i.e., indirect factory expenses, foundry expenses, and shipping, selling, and general expenses. The responsibility for each type of expense should be ascertained by departments and the budgets for the various foremen and department heads should be based on this responsibility. The determination of the types of expense which will be shown on the various foremen's budgets can be initially accomplished by preparing a financial responsibility chart on which the types of expense which occur in each department are listed.

ESTABLISHING VARIABLE BUDGETS

Productive indexes which are true indications of the intensity of production, should be chosen. Productive labor hours or dollars or machine hours are the indexes most commonly used in budgeting factory expenses. If a number of parts or products are to be produced simultaneously, the total productive labor hours or dollars or machine hours can be determined by applying the standards therefor to the items on the production schedule. In the case of a foundry, the weight of good castings produced sometimes serves very well as a productive index. Likewise, it is generally possible to establish workable variable expense budgets for shipping expenses if the variable index is the weight or number of units shipped.

By determining the productive index for each department for the next week, it is possible to determine the budget for that week. Expense allowances are based on the productive indexes. In plants where production runs evenly from week to week, it is usually possible to give variable budget charts to the departmental supervisors, from which they can determine their expense allowances each week

Fixed and variable expenses present the next problem after productive indexes have been established. It is generally understood that there are two types of expense, one type varying with the volume of production and the other varying with time. There usually are some accounts which contain both fixed and variable charges. Each account in the factory classification can generally be classified as being one of the following three types:—

(a) *Fixed*—Expenses which accrue with time such as superintendents' and foremen's salaries, taxes, depreciation, insurance, janitors, watchmen, etc.

(b) *Variable*—Expenses which increase or decrease with the volume of production such as small tools, trucking materials, grinding materials, etc.

(c) *Semi-Variable*—Accounts which contain some expenses which tend to vary with volume of production and others which tend to vary with time. For example, the inspection account may contain wages of inspectors on duty every day, regardless of volume, as well as wages of inspectors who inspect a certain number of pieces from each production run. Likewise, maintenance charges usually increase with volume but not in the same proportion.

It is not difficult to determine the fixed and variable portions of most of the expense accounts. This can be accomplished for each expense by choosing a representative number of recent operating weeks and plotting each weekly expense account on the vertical axis of graph paper against the corresponding productive index for the same weeks on the horizontal axis (See Exhibit I). This will give an assortment of points through which, in most cases, it is possible to strike an average straight line. The point at which this straight line crosses the vertical line is an indication of the level of expense which is constant and does not vary with changes in volume. By choosing a point on the horizontal axis which represents the plant average productive index for the budget year, the relation of the fixed portion of the account to the total expense can be established. As stated before, budget control is not an exact science, and methods described above must be used with judgment.

With the aid of the productive index and the information regarding fixed portions of semi-variable accounts, it is possible to revise a budget from one level to another by means of a multiplying factor which takes both items into consideration.

Setting the first departmental budget allowances is indeed a problem. Usually they are based on past performance tempered by adjustments for known abnormalities. Generally, they should be established on the tight side, but not unreasonable. It is impossible to set absolutely correct budget allowances at the beginning; however, the fact that a budget is being established will tend to make everyone a great deal more mindful of cost control and point the finger at many opportunities for cost reduction.

If a plant has not been preparing weekly summaries of departmental payrolls and other expenses, they should be started at once so that after a representative period, perhaps six months, the budget director will have the necessary background to establish the first departmental budgets. Copies of the weekly summaries should be sent to and discussed with the departmental supervisors during this period in order that they may have as much knowledge as possible of their departments in advance of budgets and in order that they may register protest to what they consider wrong charges.

Departmental budgets should be passed out at the beginning of each month on forms which have space allowed for the

departmental supervisor to post his weekly expenses from labor and material summaries which should be given to him weekly. The estimated productive index and budget for each expense should appear on this budget sheet on a weekly basis. An example of this type of budget is shown on Exhibit II.

A definite aid in establishing department budgets is to plot all of the expenses and productive index from the weekly labor and material report, on semi-logarithmic graph paper. With the time element on the horizontal axis and expense on the vertical, actual values in dollars can be plotted, and the slope of the curves will indicate the correct percentage rate of change. Thus the relation of the rate of change of each expense item to the rate of change of the productive index can be shown visually. It would be well to continue these curves for some time after the budgets are started, for the curves provide a pictorial means of explanation of trends to the departmental supervisors.

SERVICE DEPARTMENT BUDGETS

Departmental supervisors should have considerable control of the maintenance required on the equipment for which they are responsible. The cost of performing these services is also the responsibility of the service department which does the actual maintenance work. This results in a split responsibility and it can best be handled by budgeting the service department supervisors for total maintenance handled by them and by also budgeting the same maintenance to the production departments which receive the service. In other words, control such costs from both ends.

CONCLUSION

Departmental budgets provide a means of controlling expenses which are usually considered difficult to measure. If the departmental budget is administered in an understanding and reasonable manner, it will prove to be a valuable tool for top management in dealing with departmental supervisors and a definite aid to the departmental supervisors in a fuller understanding of and better performance on their jobs. The problems involved in establishing and administering departmental budgets are sometimes complex, but during the process of solving such problems, many opportunities for plugging cost leaks will present themselves.

Manufacturing Statistics and Their More Common Uses

By A. COHEN,
Chief, Manufacturing Statistics, Dominion Bureau of Statistics

A number of illustrations are here given in the practical utilization of the wealth of information available from the Dominion Bureau of Statistics. These include the use of statistics for comparing operating ratios with those of the industry, market analyses and production planning. Reference is also made to the use of statistical methods in quality control.

The need for centralized national statistics was clearly realized as early as the end of World War I. After a thorough investigation of all the factors involved in the creation of national statistics, the Dominion Bureau of Statistics was established as a result. The Dominion Bureau of Statistics was therefore charged, under the Statistics Act of 1918 (now replaced by the Statistics Act 1948) with the taking, at appropriate intervals of a census of industry and production. Since 1917, therefore, a survey of the production of manufacturing industries of Canada has been made annually. Subsequently, co-operative arrangements were made with other departments of the government concerned with the collection of statistics on the primary industries of mining, forestry and fishing, whereby the Bureau would collect statistics of production and related information, and make such data available to the departments concerned.

The census of industry as presently constituted is, therefore, concerned with the collection, compilation and publication of statistics relating to the operation of all primary industries, as well as manufacturing. This survey is made annually and is supplemented by the collection of monthly or quarterly statistics of production, and in certain instances, stock data of key commodities which experience has shown to be good barometers of business conditions and in addition furnish valuable and up-to-date facts which can be used as a guide by those industries producing such commodities.

USE OF INDUSTRIAL STATISTICS BY THE GOVERNMENT

I will now deal briefly with the use that is made by the Government of the information collected by the Census of In-

dustry. To begin with, the work of the Dominion Bureau of Statistics in the industrial field may be likened to the work done by the accounting departments of your own companies. The Bureau does on a national scale what you, as accountants, are required to do for your firms, individually. Just as it is inconceivable to run a business without proper accounting methods and controls, so it is inconceivable for a government to run a nation without a knowledge of the country's resources and of the activities of its population. When war broke out in 1939, the government had already at its disposal, a great mass of information on Canada's manufacturing capacity. This information, although not perfect or in as great detail as the government would have liked, was, nevertheless, an important factor in the government's ability to organize Canada's war economy quickly. For example, when a sugar administrator was appointed to control the importation, production and consumption of sugar, the Bureau was able to furnish him at once with all pertinent information on sugar. We were able to furnish him at once with all pertinent information on sugar. We were able to tell him how much sugar was being refined in Canada annually, how much sugar was being used by the chocolate manufacturers, the soft drink manufacturers, and how much sugar was being used by the food processors, as well as how much sugar was required for domestic consumption. With this information available, the sugar administrator could plan at once, on an equitable basis, the distribution of the available sugar supplies as between the various food processors and the domestic users. This is but one of the hundreds of examples that might be quoted in showing how statistics have become an indispensable tool for the use of government in the proper discharge of its functions.

Another use of our individual statistics is the regional information which the Dominion Bureau of Statistics makes available. Besides compiling manufacturing statistics on an industry basis, we also compile these statistics on a geographical basis. We, in the Bureau, can tell you what manufacturing is being done in each city, town, or any other economic area under review. Such regional information is most valuable to the government in making a proper assessment of the needs and potentialities of the diversified regions composing this country of ours. Such problems as Dominion-Provincial relations, for instance, depend for their ultimate solution on a clear understanding of

the national economy and a recognition of the disabilities under which certain parts of the country must carry on. In the broader field of industrial policy, the Government, to act intelligently and in the best interest of the Canadian economy, must have the necessary facts at its disposal, and such facts can only be secured through the co-operation of primary producers, manufacturers and distributors.

In the field of taxation, reliable statistics of production and consumption of all the commodities produced and consumed in Canada are a "must". Such statistics are especially important in estimating tax yields. Without such statistics, equitable administration, whether in the field of taxation or in the field of production and distribution, becomes an impossibility. It is hardly necessary to labour the point. It is so obvious that further explanation is unnecessary.

USE OF INDUSTRIAL STATISTICS BY MANUFACTURERS

Now I shall try in a few words to show the use that manufacturers can make of the industrial figures collected and compiled by the Bureau.

1. A comparison of your own operating ratios with those of the industry as a whole can serve a most useful purpose. It is important for firms to know how their cost of materials and wages, for example, compare with the total for the industry. By a study of these figures, you can tell whether your company is paying too much for its materials per dollar unit of sales. You can also tell whether your labour force is as efficient as the average firm in your industry. A study of your own firm's contribution to the total for the industry for a few years would show you whether in an expanding market, for example, you are getting your share of the increased output. These are but a few of the comparisons that each of you can profitably make. Talking about ratios reminds me of a true incident which happened a few years ago. A large firm questioned the accuracy of the cost of materials used in their industry for the year under review. Our figures seemed to be too low, so we had them rechecked and found them correct as submitted. We also found that the value of materials used by the firm in question was unusually high. We pointed out to them and asked them to recheck their figures. This they did and, much to their pleasure, they discovered that a large account had, in error, been paid twice. This naturally raised their own cost of materials in comparison with the in-

dustry as a whole. This firm found it very profitable to compare their operating ratios with those for the industry as a whole. Although I cannot promise you all such direct profits from these studies, I can, nevertheless, promise you most interesting and revealing information which your managements could use to good advantage.

2. Market analaysis is another most useful purpose to which industrial statistics may be put. No doubt some of your companies have, at one time or another, contemplated the opening up of either a branch plant or sales outlet in another part of the country, or, perhaps, an expansion of the existing plant. Before undertaking such a project, the management would like to make sure that there was a reasonable chance for success. To arrive at such a conclusion you must, of necessity, marshal a large number of correlated facts. For example, you would have to know something about the people living in the area, you as accountants would have to know their numbers, their buying habits as well as many other related facts necessary to the proper evaluation of the new market possibilities. You would have to know what industries already exist in the area and what are the possibilities of securing an efficient and trained labour force for your plant. Information on the present productive capacity of the locality under review and possibilities of the export market for your product become of prime importance. During the past few years the Bureau received many inquiries from firms who were desirous of expanding their plant. There was no problem then or, even at the present, since, in most cases, they could sell all they could produce, even with the increased plant capacity. What they were afraid of was the future, when the backlog for their products had been more or less satisfied. In many cases, they were interested in exploring the possibility of finding new uses for their product or of stimulating the demand of the present users. Population trends and earning levels of the working population are important factors which must be taken into account before such a new undertaking can be entered into with some degree of ultimate success.

3. Another reason why manufacturers should not unduly complain about having to make their annual and current industrial returns to the Bureau is that by doing so, they help to make available accurate information on our varied economic life, information which will be of benefit to themselves as well

as to the government. All of you are, no doubt, aware of the increasing complexity of national as well as international economics. It is through these increasing complexities that Governments are forced, either through necessity or as their adopted program, to enter into economic fields which heretofore have been the privileged prorogatice of private enterprise, and, as Governments enter into these new fields, statistical information of these new fields becomes increasingly important. In order to secure such information Governments must collect it, either through organizations such as the Dominion Bureau of Statistics, or through special investigating agencies such as Royal Commissions. I do not have to tell you of the cost and annoyance to which manufacturers can be put when such special investigations are being made. I am very happy to be able to tell you that the present tendency is to utilize to the utmost whatever information is being collected by the Bureau before new questionnaires are sent out by investigating committees of the Government. It is true that some of you may have had to fill some forms in connection with the hearings held by recent investigating committees but I can assure you that, had it not been for the information already made available by the Bureau and used by the committees, such forms would have increased many times over. You can readily see that by making accurate returns to the Bureau annually, as well as currently, you stand to save yourselves money and annoyance when special investigations become necessary.

Another field in which manufacturers can use official industrial statistics to good advantage is in the preparation of tariff briefs. When requesting tariff adjustments it is important to present a good case and such a case can only be presented effectively when backed by factual data. When the data used is based on official figures collected by an independent and unbiased organization such as the Bureau of Statistics, interested only in making available reliable information, such a case is bound to receive the sympathetic consideration of the Government.

Recently, the Bureau has inaugurated a monthly series on shipments and inventories. These statistics serve three main purposes: They are used to complete the picture of total investment in the National Accounts; they present business men with a picture of conditions in their own and related industries, thus making possible inventory adjustments in line with current con-

ditions; and they allow some measure of short-term forecasting of business trends which is useful for both Government and business economists.

The monthly series is compiled by means of samples in all industries, both large and small. In the majority of cases, these are large firm samples, where practically all large and smaller firms report. In such cases, the large firms hold such a high proportion of total inventory for the industry that their trends must represent the trend in their industry as a whole. In a few industries, which are made up mostly of comparatively small firms, stratum samples are used, each main product group being represented by an appropriate number of firms in each size group. There are also a few large industries producing single or closely related products for which estimates of inventory value are made from physical stock data currently collected.

Since actual inventory levels are meaningless unless used in comparison with either production or sales, shipments values are collected from all reporting firms. Also, since variations in one of the components may be as important as changes in total inventory, inventory totals are broken down into raw materials, goods in process and finished goods. These figures are all published in index form which effectively reveals trends without showing actual figures for any single industry—an important point in highly competitive industries with only a few large firms. Publication by industries is as detailed as possible, and the Bureau is always willing to make special indexes for any groups of reporting firms when the latter feel that their industry group contains too many varied types of firms.

Recently, a series on new and unfilled orders was commenced in conjunction with the inventory series. A preliminary survey had indicated that a large proportion of Canadian manufacturing is done on binding orders, so this new series should add appreciably to the usefulness of inventory statistics for forecasting purposes. It will also allow compilation of more meaningful inventory-shipments ratios, which until now have been complicated by the inclusion of two types of firms with markedly different inventory conditions—those producing mainly on order and those producing mainly for stock.

While the detailed knowledge of our economy available from annual reports is the basis of all studies, the time lag in the annual statistics needs to be overcome by current reports of

important commodity production, physical stocks, either of basic raw materials or of finished products, and so on. These current statistics serve the double purpose of providing specific information on some commodity, or group of commidities, etc., and of providing a means of projecting into the present the detail available annually. I think you will all agree that it would not be possible to collect details of all commodities on a current basis.

The important commodity, rubber, is covered at the raw or crude state, and each month every manufacturer using rubber reports to the Bureau his opening and closing stock figures, and his consumption of rubber, by types and by end product use.

Stock and poultry feed manufacturers, needing to know shipments of feeds monthly by types of feeds, and by provincial destinations, approached the Bureau with a request that such a survey be inaugurated, pledging adjustment of sales records to provide the information. This series is now of great value to industry, as well as to the Department of Agriculture, and is a fine example of co-operative effort.

Primary textiles are covered currently, chiefly through estimates of basic fabric production, but knowledge of basic clothing manufactured is also available quarterly from a special survey.

We also have a quarterly survey on processed food, which has proven invaluable to manufacturers in planning future production programs. These are only a few illustrations of what is being done currently rather than a complete statement of all the information that is available monthly or quarterly.

THE USE OF STATISTICAL METHODS IN QUALITY CONTROL

Engineers in Canada and the United States have now formed quality control societies in many industrial cities. Statisticians are engaged in diffusing a technique which has already revolutionized inspection, and which promises to have an important effect in the rationalization of the whole of the production process from design to assembly. Before quality control, the method of inspecting for a diameter was to use two ring gauges, differing by one thousandth of an inch in diameter, if that was the tolerance, and if the part passed through the larger and failed to pass through the smaller it was accepted. This method required the inspection of every item, and for all the work which that entailed no information concerning the process was forthcoming. There was no warning of anything wrong until

a series of faulty articles appeared, and when this happened, management had no alternative but to shut down and go over the materials, the methods of work of each operator, and the settings of the machines. The loss included scrap, time of the machines and of their operators, and the time of the skilled personnel engaged in looking for the trouble.

With quality control often only a small fraction is inspected. One item, be it a shell, a piston, a tank track pin, in each 10 or in each 100, say, or one each 15 minutes, is selected from the production stream and its diameter carefully measured to perhaps a hundred-thousandth of an inch. When about 500 are thus measured, a statistical study is made of the average and the dispersion of the results and inferences are possible as to whether the process can safely be trusted to turn out the part within the tolerance limits imposed by the buyer. The reasoning is from the sample of 1 in a 100 which is inspected to the nature of the process, and from the nature of the process to the 99 which are not inspected, as well as to future production. If the process cannot be trusted it must be improved until it can; then we say it is under control.

When can we trust a process? We have 10,000 chips in an urn corresponding to the production of one shift in the plant, and on each is written a number equal to the diameter of a shell, say, in hundred-thousandth parts of an inch. If there is a central tendency—some reasonably narrow distribution—in the numbers written down, then the selection of a sample of 100 will enable us to infer something about the constitution of the urn, i.e., of the numbers on the chips which are not drawn. The more similar the numbers in the urn are to one another, the fewer need be drawn to find the average and the scatter of the distribution. The theory for many of the more commonly occurring types of distribution has been worked out, and it gives definite assurance on the proportion of the articles that will come within any specified tolerance limits.

After we have initiated a process of quality control, the problem takes on a somewhat different form. We now have a (mathematical or graphical) description of a universe controlled so that the proportion of articles which fall outside of the tolerance limits is held at a satisfactory level, and the drawing of further samples is only to see that this distribution is maintained. What we do is to compare the results of our sample measure-

ments with those which might be obtained by chance. We look for runs, within the tolerance limits, which could not be assumed to arise by chance, in a universe of the type based on the initial (satisfactory) sample. Thus, long before the process goes far enough wrong to turn out any unacceptable product, we can find the faulty machine or the operator who is not following instructions or the new batch of some purchased component which is not up to standard. The search for such runs is called testing for significance, or finding out when to seek assignable causes of variation. Statistical tests are devised to keep the amount of faulty product accepted at a given low level, and on the other hand to give warning of trouble when there is no trouble as seldom as possible.

NEW STATISTICAL METHODS AS APPLIED TO INDUSTRIAL STATISTICS

As I pointed out before, the growing complexity of modern economic life compels governments to obtain more and more data on which to base their economic policies and for the efficient discharge of their responsibilities in the ever-widening field of activity. To get this information is an expensive proposition and also throws a burden on industry in general, which of necessity must be called upon to furnish the desired data. Realizing this and also the fact that the necessary information must be secured, the Bureau during the past few years has been casting about for new statistical techniques which would lessen the burden on industry and also would at the same time secure substantially correct data for the use of the administrator. With this end in view the sampling unit of the Bureau was organized. With manufacturing statistics, the sampling techniques were not always applicable. Other methods, therefore, had to be adopted in order to lessen the burden of the smaller manufacturer at least, and at the same time secure substantially correct results. It was found, for example, that in 1946 out of 31,249 manufacturing establishments, 19,002 with a value of production of $50,000 or less, contributed only 3.7 per cent of the total value of production. On the surface it looked obvious that the Bureau could exempt these 19,000 establishments from making annual returns and still obtain satisfactory results. This would be true if we were only interested in the total value of production or the total value of materials used. This, however, is not the case, as the Bureau by necessity is also interested in

the details of the products made and the materials used. By a study of each industry, it was found that by exempting the smaller establishments in some industries that for some commodities produced or materials used we would lose more than 50 per cent of the total. This obviously could not be. Complete exemption was out of the question. New methods had to be designed to relieve small establishments of the difficult task in furnishing information. A study was therefore made of each industry classification of which there are about 200 and different cut-off points were determined for different industries. The general rule adopted was that wherever possible establishments with a value of production of less than $50,000 per annum should only be required to furnish that figure to the Bureau, and that on the basis of the information received from the larger firms the Bureau would estimate for each of the small establishments the number of employees, the salaries and wages paid, as well as the value of the materials used. These estimates could not be far out, as in most industries the percentage that these smaller establishments contribute to the total for the industry is only from 10 to 20 per cent. When it was found that there would be a great loss in commodity data, instead of asking only for the gross value of production, the smaller firms will be required to fill in a shorter form which lists the commodities in which there would be a substantial loss if no information was obtained from small firms. In other cases, the cut-off point was reduced to $25,000 or $15,000. The new methods of compiling the census of manufacturers will be put in operation this year, and will go a long way in relieving the small operator from the irksome duty of filling in complicated and detailed returns to the Bureau.

THE CANADIAN STATISTICAL REVIEW

The keystone of the Bureau's work is the immediate publication of existing up-to-date statistics in a usable form by presenting them as clearly, interestingly and attractively as possible. All the advantages of improved methodology and refinement mentioned previously would lose their point if this were overlooked. The development of a suitable publicity vehicle (preferably on a monthly basis) that is quite up-to-date and of the greatest possible use to all groups in the country is the logical end product of such an improvement program. In an effort to meet this need, the Monthly Review of Business Statistics, which

in the past has enjoyed a wide circulation and served the needs of its day very satisfactorily, has been completely recast under a new title, the Canadian Statistical Review.

The name was selected as being expressive of the present character of the publication. When the Monthly Review of Business Statistics was first published in 1926, it was confined more to business statistics than it now is, and was, in fact, paralleled by another publication called the Monthly Bulletin of Agricultural Statistics. As time passed, however, the Monthly Bulletin of Agricultural Statistics was expanded to include more and more tables and to cover wider and wider fields, until it became far more than a review of business statistics. It became, in fact, a review of Canadian statistics.

With the change in name, considerable changes have been made in the format. The size of page now conforms to that of the generality of Bureau publications and indeed to that of most publications of a similar character issued by other nations. The larger page permits the statistics to be better spaced and to be printed in more readable type. It allows, too, for the inclusion of longer tables, and advantage has been taken of this to show monthly figures for the past twenty-four months and monthly averages for the immediate past ten years and for two or three important years before that, wherever this material is available. This gives a better historical perspective to the current figures.

Statistics contained in the new Review, are to a large extent the same as in the old, but the tables have been considerably re-arranged to give unity to each section. The table of contents shows the grouping according to the main sectors of the Canadian economy. There is an introductory group of tables which contains a selection of significant economic statistics for Canada, the United States and the United Kingdom. Some comparison is thus provided between developments in Canada and those in the two countries which have the greatest influence on our economy.

A new feature is the policy of including each month an article which discusses a particular series or field of statistics. It describes in non-technical language and non-technical concepts how these statistics are compiled and what are their limitations and usefulness. In other words, it aims to give the layman, month by month, a good description of the statistics contained in the Reviews, so that he may know how best to use and apply them.

« STUDENT SECTION »

FUNDAMENTALS OF COST ACCOUNTING

Comments by A. V. HARRIS, C.A., R.I.A.

QUESTION 3 (35 marks)

Three products, A, B, and C are manufactured by the Grando Manufacturing Company. The company operates four departments:

Dept. I, Dept. II, Dept. III and Dept. IV.
Product A in Dept. I, Dept. II.
Product B in Dept. I, Dept. II, Dept. III.
Product C in Dept. I, Dept. II, Dept. IV.

The production for the month of January required the following expenses:

	Material	Labor	Mfg. Expenses
Dept. I	$29,000	$ 8,000	$ 2,000
Dept. II		11,000	7,500
Dept. III	300	1,700	1,000
Dept. IV	2,000	4,000	1,000

The production for the month was:

	Units Started	Units Finished	Units In Process
Dept. I	400,000	380,000	20,000
Dept. II	380,000	360,000	20,000
Dept. III	80,000	70,000	10,000
Dept. IV	60,000	40,000	20,000

Work in process in each Department is estimated to be one half finished (Material, Labor and Manufacturing Expenses).

Of the 360,000 units finished in Dept. II, 220,000 became Product A and were transferred to a special stores account.

All 70,000 units finished in Dept. III became Product B, and were transferred to the special stores account.

The Product finished in Dept. IV, is called Product C.

Required:

A statement of cost of production in terms of finished units.

(1) Quantity of production in terms of finished units.

(2) Computation of unit cost in each department, and cumulative after each department.

(3) Computation of Work in Process and Finished Goods inventories assuming none of the product has been sold to the end of the period.

Solution to Question 3

THE GRANDO COMPANY

Statement of Cost of Production
For January 194....

	Dept. I	Dept. II	Dept. III	Dept. IV		Total
Material	29,000		300	2,000		
Labor	8,000	11,000	1,700	4,000		
Mfg. Expenses	2,000	7,500	1,000	1,000		
Departmental Cost	39,000	18,500	3,000	7,000	=	67,500
Cost from Prev. Dept.		38,000	12,000	9,000		
	39,000	56,500	15,000	16,000		57,900
Cost of goods Transferred to next Dept. or stock	38,000	54,000	13,300	11,600		
Cost of Goods in Process	1,000	2,500	1,700	4,400	G. P.	9,600
	39,000	56,500	15,000	16,000		
				Finished		57,900
Cost per pound in Dept.	,10	,05	,95	,14		
Cumulative cost per pound	.10	.15	.19	.29		

Quantity Report

To be accounted for		400,000		380,000		80,000		60,000
As follows:								
Transferred		380,000		360,000		70,000		40,000
In Processs		20,000		20,000		10,000		20,000
		400,000		380,000		80,000		60,000

Equivalent Production

Transferred		380,000		360,000		70,000		40,000
In Process	20,000	10,000	20,000	10,000	10,000	5,000	20,000	10,000
	2		2		2		2	
		390,000		370,000		75,000		50,000

STUDENT SECTION

COMPUTATION OF UNIT COST

Dept. I	$39,000 ÷ 390,000 =	.10
Dept. II	18,500 ÷ 370,000 =	.05
	Prev. Dept.	.10
	Cumulation Cost	.15
Dept. III	3,000 ÷ 75,000 =	.04
	Previous Dept.	.15
		.19
Dept. IV.	7,000 ÷ 50,000 =	.14
	Prev. Dept. (Dept. II)	.15
		.29

COMPUTATION OF INVENTORIES

				Summary in process	Finished
Dept. I	Transferred	380,000x10c=	38,000		
	In Process	20,000x10c=	1,000	$1000	
		2			
Dept. II	Transferred to stock	220,000x.15 =	33,000		$33,000 A
	To Dept. III	80,000x.15 =	12,000		
	To Dept. IV	60,000x.15 =	9,000		
			54,000		
	In Process:	20,000x.05	500		
		2			
	Prev. Dept.	20,000x.10	2,000		
			2,500	2500	
Dept. III	Transferred to stock 10,000x.19		=13,000		13,300 B
	In Process: 10,000x.04		200		
		2			
	10,000x.15		1,500		
			1,700	1700	

Dept. IV	Transferred 40,000x.29	=11,600		11,600 C
	In Process 20,000x,14	= 1,400		
	2 20,000x.15	= 3,000		
	(from Dept. II)	4,400	4400	
			9,600	57,900

Comments on Question No. 3

This problem was not difficult, and students having a knowledge of process costs found no difficulties in their solutions. Some students omitted to prepare a schedule or include in their schedule production in terms of finished units (the first of the requirements). Many students obtained a mark of 30 or better in this problem.

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